

Applicant: Pekka Rytty  
Application Serial No. 10/825,857  
Filing Date: April 16, 2004  
Docket No.: 187-77  
Reply to Non-Final Office Action mailed November 14, 2005  
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### **REMARKS**

Pursuant to the non-final Office Action mailed November 14, 2005, which has been carefully considered, Applicant respectfully requests reconsideration. To further the prosecution of this application, each of the issues raised in the Office Action is addressed herein.

Claims 1-10 are currently pending in this application, of which Claims 1, 9, and 10 are independent claims. By this Amendment, Claims 1-6, 9, and 10 have been amended to further clarify that which the Applicant regards as the invention and to conform these claims to U.S. practice. The application as now presented is believed to be in allowable condition.

A. **Allowable Subject Matter**

Applicant notes that at page 6 of the Office Action, Claims 5 and 6 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. The conditional allowability of Claims 5 and 6 is acknowledged and appreciated.

B. **Claim Rejections under 35 U.S.C. §102**

Claims 1-3, 9, and 10 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,120,294 to Wolfe (*Wolfe*). Specifically, the Office Action indicates that *Wolfe* discloses a heart rate indicator in the form of a wristband having a strap 11 and a casing 12 with electrically conductive inner and outer layers 13 and 14. As shown in Figure

1, when worn on the wrist, only the conductive inner layer 13 is in contact with the wrist, which serves as one electrode of the system. The other electrode of the system is the conductive outer layer 14, which is disclosed as a single electrode that, except for the display area, completely encircles the user's wrist.

Thus, the device in *Wolfe* has a single inner electrode and a single outer electrode. The inner electrode connects to the wrist to which the apparatus is attached and the outer electrode connects to the other hand. Therefore, it is respectfully submitted that nothing in *Wolfe* would teach or suggest an electrically conductive outer structure comprising a first electrode and a second electrode on opposite sides of the wrist to which the apparatus is attached, as now defined by amended Claims 1, 9, and 10.

Since the *Wolfe* device has only one outer electrode, a connection can be made with the outer electrode using only a single finger, such as an index finger 17b shown in Figure 1 and described at column 3, lines 6-19. Heart rate measurements based on contact with a single finger are typically inaccurate due to movement of the finger in relation to the electrode. The disadvantages of devices with only a single outer electrode are disclosed at page 1, paragraph 4 of the specification, which indicates that when the measuring device is permitted to provide a readout when touched with only one hand, the forces acting between the hands vary considerably, particularly when the user is moving, which impairs the measurement contact, the quality of the detected EKG signal, and the measurement result achieved therefrom. Moreover, it is very difficult for the user to keep his finger on a single electrode (without providing an opposing force) and this contact may easily be lost, which

further impairs measurement accuracy. Lateral hand movements in particular cause motion-related disturbances in the detected heart rate signal.

In contrast, when the electrically conductive outer structure includes at least a first electrode and a second electrode on opposite sides of the wrist, as now defined by amended Claims 1, 9, and 10, a reliable measurement is far more likely since the user must touch both contacts with different fingers. Further, since the contact areas are physically separated, separate signals from each of the electrodes are thereby available to yield a substantially more accurate signal by means known in the art, such as differential amplification. In addition, as indicated at page 4, paragraph 11, since the first and second electrodes are subjected to forces acting from opposite directions, contact disturbances with respect to either one of the electrodes caused by, for example, movement of the finger on the electrode or movement of the wrist with respect to the finger, are substantially reduced since a decrease in contact force on one side of the wrist can easily be compensated by an increase in contact force on the other side of the wrist, which further improves the reliability of the resulting heart rate measurement.

Accordingly, Claims 1, 9, and 10 have been amended to further clarify that the electrically conductive outer structure comprises at least a first electrode and a second electrode on opposite sides of the wrist to which the measuring device is attached. These electrodes are adapted to be touched with separate fingers of the user's other hand from opposite directions of the wrist to which the device is attached.

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Further, although the Office Action indicates that the outer layer 14 being in electrical contact with the casing 12 (column 2, line 69 - column 3, line 2) is equivalent to the wired connection of the at least one electrode to the measuring unit, Applicant respectfully submits that nothing in *Wolfe* would teach or suggest that at least one of the electrodes is connected to the measuring unit with a wire inside the wristband, as defined by Claims 1, 9, and 10. Encasing the electrical connection between the electrode and the measuring unit in the wristband substantially improves the reliability of the measuring device and its ability to withstand moisture and other environmental factors.

C. Claim Rejections under 35 U.S.C. §103

Claim 4 was rejected as being obvious over *Wolfe* in view of U.S. Patent No. 3,870,034 to James (*James*).

*James* relates to a wrist-worn device for measuring a galvanic skin response or resistance between the fingers of one hand, which is used to indicate nervous system activity or stress level. When the user touches the two electrodes on the device with two fingers, the resistance of the skin is measured and converted into a variable pitch audible signal or a flashing light. However, like *Wolfe*, it is respectfully submitted that nothing in *James* would teach or suggest an electrically conductive outer structure comprising at least a first electrode and a second electrode on opposite sides of the wrist to which the measuring device is attached, nor that the electrodes are connected to the measuring unit with a wire inside the wristband.

In addition, it is respectfully submitted that *James* measures resistance not heart rate, measures the parameters of only one hand not two, provides a signal that is used to make the measurement rather than measuring the signal provided by the user, does not use two electrodes to improve the contact thereto but is rather forced to use two contacts to obtain the resistance measurements between the contacts, that is, resistance measurement is simply impossible with only one electrode. In addition, as indicated above, *James* does not have an inner electrode in contact with the wrist to which the device is attached, nor are the outer electrodes on opposite sides of the wrist. For these reasons, it is respectfully submitted that *James* represents non-analogous art, should thus not be available for combination with *Wolfe*, and even when so combined would not provide the result defined by Claims 1, 9, and 10.

Applicant respectfully notes that in order to support a claim of *prima facie* anticipation, a single reference must teach or enable each of the claimed elements as arranged in the claim interpreted by one of ordinary skill in the art. Further, in order to support a claim of *prima facie* obviousness, the cited references must teach or suggest each and every element of the invention, and there must be a motivation in the references or the prior art to combine the references and the prior art as suggested.

However, nothing in the art of record, which includes U.S. Patent No. 4,091,610 to Sasaki et al. (*Sasaki*) and U.S. Patent No. 4,295,472 to Adams (*Adams*), would teach or suggest, either alone or in combination, a heart rate measuring device to be attached around a user's wrist comprising an electrically conductive outer structure with at least a first electrode and a second electrode on the outer surface of the measuring device, on opposite sides of the

wrist to which measuring device is attached, which first and second electrode the user is to touch with separate fingers of the users other hand from opposite directions of the wrist to which the device is attached, wherein at least one of the electrodes is connected to the measuring unit with a wire inside the wristband, as now defined by amended Claim 1. Further, nothing in the art of record would teach or suggest a method for manufacturing a heart rate measuring device including providing an electrically conductive outer structure to provide a first electrode and a second electrode adapted to be in contact with the user's other hand, and connecting at least one of the electrodes to the measuring unit with a wire inside the wrist band, as now defined by amended Claim 9. In addition, nothing in the art of record would teach or suggest a method for measuring heart rate comprising bringing a user's other hand into contact with the device by having the user touch at least a first electrode and a second electrode of an electrically conductive outer structure on opposite sides of the wrist to which the device is attached, wherein at least one of the electrodes is connected to the measuring unit with a wire inside the wristband, as now defined by amended Claim 10.

Applicant respectfully submits that Claims 2-8, which ultimately depend from Claim 1 are patentable over the art of record by virtue of their dependency from Claim 1. Further, Applicant submits that Claims 2-8 define additional patentable subject matter in their own right. Therefore, it is respectfully requested that the rejection of Claims 1-3, 9, and 10 under 35 U.S.C. §102(b) and the rejection of Claims 4, 7, and 8 under 35 U.S.C. §103(a) be reconsidered and withdrawn.


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### **CONCLUSION**

Entry of the amendments to Claims 1-6, 9, and 10; favorable consideration of Claims 1-6, 9, and 10, as amended; favorable reconsideration of Claims 7 and 8; and allowance of pending Claims 1-10 are solicited.

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number provided below to discuss any outstanding issues.

Respectfully submitted,



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